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THE  
TURPENTINE WAXED-PAPER  
PROCESS

DESCRIBED AND ILLUSTRATED

BY THE

REV. J. LAWSON SISSON.

TO WHICH ARE ADDED NOTES UPON THE WAX-PAPER  
AND OTHER PROCESSES.

LONDON:  
A. MARION AND CO. 152, REGENT STREET.

M.DCCC.LVIII.

*Thomas Jefferson*

Thomas Gulliver -



THE TENTH VOLUME

1865

NEW YORK

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## INTRODUCTORY REMARKS.

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THIS little work on Photography is intended to facilitate the labours of the amateur. It is, consequently, not an elementary treatise, but addressed to those who possess some knowledge of the art. I have, therefore, assumed that the reader is acquainted with the names and uses of the various apparatus, and that he also understands the distinctions of *positive*, *negative*, &c. The following pages are the result of the best experience—a long practice; and they describe a *negative* process, which, in my hands, has given excellent results. In all the manipulations, this process is exceedingly simple and easy; and I think that in introducing it in an English form to my brother amateurs, I shall be doing a service. In France, the wax-paper process of Legray, with its modifi-

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cations—the ceroleine process of M. Geoffray—the turpentine wax-paper process of M. Lespiault—and that of M. Tillard, now to be described, have many more advocates, than in England. Indeed, the Commissions appointed by the French Photographic Society to report on its annual exhibition of photographs, have constantly expressed their belief, that the future of photography rests upon paper, and not upon glass. They have satisfactorily proved, that for artistic effect, for certainty of good results, for ease in manipulation, and, particularly, for the requirements of the photographic tourist, the paper processes are superior to all other methods.

The great and only difficulty in working these processes, is that of obtaining a paper perfectly free from texture and spots, and which shall, when waxed, be nearly as transparent as glass. Some of the papers manufactured by MARION, and prepared by M. Tillard's process, are very transparent, and perfectly free from any texture that can be



imprinted on the positive. I give the preference to those named *extrà prompt* and *compacte*. With the ordinary wax-paper process, the *extrà prompt* is by far the best I have yet employed; but with the turpentine process, the *papier compacte* has given me equally good results, and for pictures of very large size, its thickness and toughness render it, perhaps, more suitable.

The accompanying Stereoscopic Views have no pretension to perfection, but are given to enable amateurs to judge of M. Tillard's process in the hands of one like themselves. The negatives, indeed, were taken under disadvantageous circumstances, the thermometer ranging from twelve to twenty degrees below freezing point of Fahrenheit; nevertheless, the exposure was only one minute and a half to two minutes and a half in the sun. My lens is a compound one, with a half-inch diaphragm between the lenses. During the months of December and January, I took about fifty double views by the turpentine process described, and

without one negative that could be termed a failure. And with the camera I use, I could, without any difficulty, take thirty views, or more, during a summer's day. The instrument, which was sent me on trial by M. Marion, has a peculiar construction of dark slide of his invention, whereby I am enabled to change the papers with the greatest ease and expedition. Those purchasers of this work who happen to possess a copy with views of an ancient Tower at Lutry, on the borders of Lac Lemman, will observe how slightly the oblique shadows on the houses on the right-hand side differ in the two views. The whole time occupied in taking the two views and changing the paper, amounted to less than four minutes !

In Mr. Sutton's admirable work on the Calotype process, the advantage of gumming the prepared papers in front of the glass, of the dark slide, nearest the lens, instead of merely placing them between two glasses, is strongly insisted on. Long before I saw Mr. Sutton's book, I had effected

the same thing by merely fastening the sensitive papers at the corners with wafers, on a very stiff piece of cardboard; a more homely method, certainly, but avoiding the risk of breakage, and reducing the weight. For the stereoscopic camera I have suggested a form of slide, in which the prepared paper is gummed to a piece of smooth *papier maché* or varnished cardboard, and M. Marion has fitted up several cameras after this mode. Mr. Sutton says, "The glass in front of the paper absorbs and reflects a considerable amount of light, and thus prolongs greatly the necessary time of exposure, while it disturbs the true focus. It has also the effect of rumpling the paper as it becomes dry, and upon an uneven surface it is obviously impossible to obtain a perfect picture." These observations are very true and very important; but I think there is another strong reason why it is advisable to get rid of the glass. Very often in hot weather, when the shutter is drawn up preparatory to uncapping the lens, a formation



of condensed vapour takes place upon the front glass, which, to a certainty, prevents a tolerable picture from being obtained. The lens is often covered in the same way, as every one knows; but it is very easy to see *that*, and we can wait until the moisture has evaporated! but this is clearly impossible with the slide containing the sensitive paper. I have seen numbers of strange-looking indistinct negatives, produced in this way. Mr. Sutton's remarks upon all the niceties of manipulation, causes of failure, &c., are so excellent, that every amateur ought to possess his work on the Calotype.

I cannot, however, recommend the Calotype process to tourists on the Continent, and it is particularly to them that I address myself. Any process that admits gallic acid into the sensitizing solution, is susceptible of very limited application here. Nor can I, from what I have seen of Taupenot's process with dry collodion, recommend *that* either to photographic tourists. There ap-

pears to be as much uncertainty with it, as with the paper processes, or indeed more. A friend of mine, a Swiss gentleman, who has devoted much time and attention to photography, has met with great unsucccess in working the dry process. The risk, too, of carrying about a large quantity of prepared plates in sealed boxes, which some prying custom-house officer may take a fancy to open and spoil, or which may be easily broken *in transitu*, reduces greatly the advantage of a little extra sharpness in the pictures. And, after all, the results are not to be compared with those of wet collodion; and those photographers who have the means of carrying about with them all the *materiel* of bottles, tent, and glasses, ought not to content themselves with anything else.

In addition to M. Tillard's process, I have given a very simple formula for the wax-paper process. I believe as good results can be obtained by-it, as by the more complicated formulæ which are, to judge from the pages of the *Photographic*

*Journal and Photographic Notes*, so much employed just now.

I have also described a process upon paper invented by M. Marion, and described in M. Monkhoven's work. It gives most charming results, but is rather complicated, and requires a press to cylinder the paper after the first ioduration. The paper can, however, be procured, ready prepared, of M. Marion.

J. LAWSON SISSON.

*Lausanne, Switzerland,*

*May, 1858.*



## The Turpentine Process of M. Tillard.

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THE paper which I recommend for this process, after numerous experiments, is MARION'S negative *extra prompt*. It is most carefully prepared, gives uniform results, and is remarkably free from metallic spots.

Nothing can be easier than the operation of

### IODIZING THE PAPER.

Dissolve by moderate heat, one oz. of pure white wax in twenty oz. by weight of the ordinary spirits of turpentine. Let it rest for twelve hours, and then filter. Add carefully, and by degrees, to the

filtered liquid, two drachms of pure iodine. The mixture produces a sort of boiling, and is at first of a reddish colour, which shortly changes to that of a weak solution of chloride of gold.

To this preparation next add two ounces, by weight, of cold-drawn castor-oil. Mix well.

Pour this solution into a flat porcelain dish, scrupulously clean and dry, and in it immerse your negative paper, cut to a convenient size, for three or four minutes; taking care not to place too many sheets at a time in the liquid, and avoiding the formation of air-bubbles.

The paper becomes transparent, and like parchment in tenacity. Remove the paper, sheet by sheet, and hang up to dry in the usual way. When dry, place the paper between the leaves of a portfolio, where it will keep well for some time. The liquid will serve to iodize fresh paper until it is exhausted.

Paper thus easily prepared, and sensitized in an aceto-nitrate of silver bath, gives very good results

indeed—the negatives being very transparent in the lights, and of an intense black in the sky and the other dark portions ; but the time of exposure is as long as with the ordinary wax-paper process. By submitting the paper, however, to a second process, as indicated by M. Tillard to the French Photographic Society last year, it is rendered much more sensitive, and is well worth the additional trouble bestowed upon it in iodizing it a second time. I have taken a good portrait, in mid-winter, in half a minute with paper thus iodized a second time. Here is the process :—

Serum of Milk . . . 18 fluid ounces.

Dissolve in it :

Iodide of Potassium . . 3 drachms.

Bromide of Potassium . . 2 scruples.

Add to the above the whites of five eggs, beaten to froth ; then beat all the ingredients well together ; let the mixture rest for some little time ; filter through fine muslin (double) into a flat porcelain dish ; plunge sheet upon sheet of the paper,



*previously iodized*, and *quite dry*, into this second bath, avoiding the smallest bubbles of air between the sheets; leave them in this bath at least fifteen minutes—longer iodizing does no harm—remove one by one, and pin up to dry, placing a morsel of white blotting-paper at the lower corner to hasten the drying; preserve in a dry place between blotting-paper.

#### SENSITIZING THE PAPER

is the next operation, which, as all my readers are aware, must be done by the light of a taper in the dark operating-room.

The bath is composed thus:—

Nitrate of Silver . . . .	20 grains.
Nitrate of Zinc . . . .	10 grains.
Citric Acid . . . . .	10 grains.
Distilled Water . . . .	1 fluid oz.

Or the following, which I usually employ in preference to the above:—

Nitrate of Silver . . . . .	30 grains.
Lemon Juice . . . . .	8 drops.
Acetic Acid . . . . .	$\frac{1}{2}$ drachm.
Distilled Water . . . . .	1 ounce.
Iodide of Potassium . . . . .	$\frac{1}{2}$ grain.

A sufficient quantity of this may be made to last some time. It improves with keeping. It must not be exposed at any time to daylight.

M. Tillard plunges his paper into a bath of the above for four minutes. I invariably sensitize both this paper, and the ordinary iodized wax-paper of Legray, upon a glass plate, set level.

Clean the glass thoroughly; set it level; filter on to it a drachm or two (according to the size of the paper) of the aceto-nitrate solution; spread it with a bit of wax-paper; place the smoothest side of the paper, which ought to have been marked at first, carefully on the liquid; leave it there until the upper side has almost lost its pinkish-yellow tinge; then reverse the sheet, leaving it in contact with the silver solution for about a

minute. Remove it by one corner with a pair of horn forceps, and wash it well in rain water for some minutes. You can hardly wash it too much. Blot off between two fresh sheets of blotting-paper, and pin up until all the sheets you are going to prepare, are washed. It is necessary to filter a few drops of fresh aceto-nitrate on to the glass plate between the sensitizing of each of the papers; and when all are sensitized, pour off the remaining liquid into a bottle containing a solution of common salt. All the silver falls to the bottom as chloride of silver; and when sufficient is obtained to make it worth while, you can reduce the chloride to the metallic state by heating it in a crucible in the ordinary way. Very little silver is lost, and you have a fresh sensitizing solution for every sheet of paper, and there is no need of kaolin or animal black. I prefer this mode very much to the usual one of employing the bath over and over again; but if you prefer using a bath, then you must add some kaolin to preserve the solution clear, other-



wise the albumin in the second iodizing bath would soon discolour it.

The papers are now ready for

#### PLACING IN THE DARK SLIDES OF THE CAMERA.

The cameras which I use by preference are fitted with dark slides on Marion's system. I know these multiplied slides are looked upon with suspicion. I can only record my own experience of them, and that is entirely in their favour. In very large cameras they may be inconvenient; but for cameras of whole-plate size and *under*, they are most excellent. It is very difficult to describe them without diagrams, but the manipulation is very easy, and learned in five minutes. The slides consist of two distinct portions. First, the dark slide, which differs very little from the ordinary dark slide with two glasses between which the paper is placed. In Marion's slide, the back glass is taken away entirely, and the front glass is firmly fixed in position by lac-varnish; a long narrow

slit is cut through the upper outside part of the slide into the inner part, so that a plate of glass slipped through it would occupy the very place which the back glass ordinarily occupies; this is the chief difference. The second portion consists of any number of cardboard envelopes, or *portefeuilles préservateurs*, as they are called, intended to hold two sheets of sensitized paper each; the sensitized paper is fixed by bits of wafer on a piece of cardboard, which slides into the envelopes. A piece of black thin pasteboard over the mouth of the envelopes keeps out all light. When the camera is in position, and the focus found, one of these portefeuilles is inserted in the dark slide, and the door shut. The upper portion of the portefeuille projects through the slit cut in the top of the dark slide, and by it the envelope is drawn up, and consequently one piece of prepared paper is pressed against the glass inside the slide. The shutter is now drawn up—the cap removed from the lens. After the exposure is finished, the envelope

is pressed down again to shield the sensitive paper, the door opened, and the portefeuille removed. There still remains the second piece of prepared paper whereon to take a second view, the process being the same as the first. The sides of the portefeuille are numbered 1, 2, to avoid exposing the same side twice. Eight or ten of these envelopes weigh not so much as an ordinary slide, and with each of them you can take two views. Instead of a slide with ground glass for focussing, a piece of ground glass slipping into the slit through which the portefeuille passes is sufficient, and ensures the true focus for the prepared paper. I ought to mention that the Bristol-board, on which the sensitized paper is fixed, is retained in its place within the slide, while the envelope is being drawn up, by a small projecting pin of brass at the bottom of the door of the dark slide, which presses on a band of linen affixed to the Bristol-board. The springs on the door of the slide which press the paper against the glass are covered with

linen, to prevent the sensitive paper being injured. When I first saw these slides I felt convinced it would be impossible to avoid spoiling the papers with the springs: I have now no fear whatever; I have never had a negative injured in this way. The sensitive papers being then placed either in these *portefeuilles préservateurs*, or in the ordinary slides, or affixed to sheets of glass, as recommended by Mr. Sutton, are ready to be taken by the photographer to the place of action. If the photographer has been able to *fix upon a point of view* beforehand, a great saving of trouble and time will be the consequence.

It is impossible to give any positive directions as to

#### THE TIME OF EXPOSURE IN THE CAMERA.

From some experiments I have lately made, the turpentine paper seems to be, at least, one-third more sensitive than the ordinary wax-paper. As the paper bears, without injury, a prolonged action



of the developing bath, it is well to avoid over exposure.

The paper will keep well many hours after exposure in the camera, and before developing. I have developed some negatives the day after; but, although this is sometimes exceedingly convenient, I would by no means recommend it as a rule. I would especially enforce the necessity of having the developing dishes thoroughly clean. Notwithstanding the bad name that cyanide of potassium has got, I always make use of it to clean my dishes and hands. Into a *perfectly clean* dish, then, pour equal portions of saturated solution of gallic acid in rain water, and rain water; it is important not to have the gallic acid stronger than this. Add five or six drops of either of the sensitizing silver solutions described above to every four ounces of the bath; the silver solution must not have served for sensitizing. I usually let the negatives float on this developing bath, exposed side in contact with it, for a few minutes, until the paper lies flat,

and the image has begun to appear. Then, by means of a triangle made of a thin glass rod, push the paper under the solution. There is some little difficulty in keeping the turpentine paper under the solution; its pores are so cemented together by the turpentine and oil, that it is not easily saturated with the solution, and consequently will float. It must therefore be watched. The glass triangles are excellent tools in photography. The Vicomte Vigier employs them for spreading the sensitizing and developing solutions over the paper in the Talbotype process. They are most useful in iodizing wax-paper; with two of them you can push the paper under the solution with the greatest ease, holding the paper with one of them at one corner, while with the other you chase away every air-bubble by rolling, as it were, the base of the triangle over the length and breadth of the paper. Any one can easily make them with a glass rod three-sixteenths of an inch in diameter. I bend the rod in the flame of an ordinary tallow candle,

fastening the two ends which form one of the angles of the triangle with a bit of marine glue. They are very superior to the straight or bent rods sent out by the opticians with their photographic apparatus: the triangle is held by the cemented angle.

The development is continued until the sky is intensely black, for the hyposulphite bath and the after-waxing much reduce the intensity of the negative. The paper sometimes acquires a dirty yellow colour in the bath: no attention need be paid to that. Some of the best negatives are of this colour: they print as well as the others. Sometimes, when I feared the exposure had not been sufficient, I have tried, and with great success, the following method of development: pour into a flat-bottomed dish just enough of the following solution to cover it:—

Distilled Water . . . . .	1 ounce.
Pyrogallic Acid . . . . .	2 grains.
Aceto-nitrate of Silver . . .	2 drops.



Float the negative until the picture begins to appear; remove it carefully; let it drip for a moment, and then place it on the gallic-acid bath as above. When the picture is fully developed, the blacks are beautifully dense. In both cases, when all the details are quite out, and the sky sufficiently dense, wash the picture in common water, changed twice, and then plunge into a freshly made bath of hyposulphite of soda of usual strength, say :—

Hyposulphite of Soda . . . 1 ounce.

Rain Water . . . . . 8 ounces.

Let it remain no longer than is just sufficient to dissolve out all the yellow iodide of silver. After that, wash it well in several changes of water, for two or three hours at least, and blot off with clean blotting-paper, and hang up to dry. When *thoroughly dry*, it is ready for waxing. With the turpentine paper this is very easy, for it instantly imbibes the melted wax. I know no better plan than to use one of the waxing-dishes, made by

Bland and Long, with a reservoir for water under them, and which is heated to boiling heat by a spirit lamp. Some cakes of pure white wax thrown into the upper vessel are soon melted. The negative, laid down with care in it, is at once soaked. Raise the paper by one corner; let all the superfluous wax flow off. Remove the remaining excess of wax, by ironing between some clean sheets of blotting-paper, taking especial care that the iron is not too hot. The picture is then finished; and, if ordinary care has been bestowed upon the various operations, the amateur will be rewarded with a splendid negative, having the appearance of a fine Talbotype, rather than that of a wax-paper negative.

#### REMARKS ON THE ABOVE PROCESS.

It is well to avoid leaving the paper too long on the sensitizing solution, as it occasionally gives a "spotty" appearance to it.

Too much silver in the gallic-acid bath injures the negatives, by causing a dingy appearance in the lights. The negative, examined by a magnifying glass, appears covered with little black filaments. This is often seen in wax-paper negatives, and would seem to be fibres of the paper, charred, as it were, by too strong a solution of nitrate of silver.

M. Tillard, like Sir William Newton, recommends a little camphor to be added to the gallic-acid solution. M. Tillard also adds it to the iodized turpentine bath. I am inclined to think it helps to keep the lights clean.

Gutta-percha baths must, on no account, be employed for the turpentine solution, nor for the developing baths.

It is an advantage for the traveller to be able to use a sheet of glass to sensitize the paper upon. The Rev. Mr. Raven, in an excellent paper in *Photographic Notes*, recommends the tourist to take with him a second piece of ground focussing-



glass, in case of accident. This ground glass answers excellently. The solution does not so easily run off. The glass is easily cleaned by washing well, and rubbing dry with "*papier Joseph.*"

For developing, the best dish is a solid glass one; the extra expense is more than repaid by the assurance the photographer feels of having always a dish which he can easily and thoroughly clean, and which cannot imbibe any deleterious agents.

I strongly recommend that the box in which the chemicals are carried be divided into compartments, of various sizes, by means of thin sheets of cork. The bottles are better to pack, and take up less space, *if square*, and they ought to require *pushing* into their places. The advantages of this are evident, and I am surprised I have never seen it used nor recommended. The cork is light, inexpensive, will stand all climates, gives to pressure, is easily glued, and can be pro-

cured everywhere.<sup>1</sup> The boxes of photographic apparatus made by the opticians for tourists are generally quite unfit for the purpose; the bottles tumbling about in holes much too large for them, and all things occupying much greater space than they ought.

In one of the late numbers of the *Bulletin* of the French Photographic Society, a member, M. Paul Gaillard, recommends Benzine collas, instead of turpentine, in M. Tillard's process.<sup>2</sup> It is stated "that the paper requires much less exposure in the camera, and that the blacks of the negative are even more intense than in the turpentine process." The price of the benzine, and the impossibility of obtaining it here, have prevented my trying it, but

<sup>1</sup> This was written some time before I had seen, in the *Photographic Journal*, a notice to the effect that Messrs. Murray and Heath had just manufactured a set of photographic apparatus for Dr. Livingstone, in which cork was used as here recommended.

<sup>2</sup> This is not a novel suggestion, I find. M. Alphonse de Brébisson recommended Benzine, for the same purpose, three years ago.

I have no doubt of the results being as stated in the *Bulletin*.

For greater security in changing the papers in the open air, I employ a black cotton-velvet bag, lined with *yellow* calico, the ends of which have a strong vulcanized india-rubber ring running loosely in a hem, so as to close tight round the wrist. In this I can change either papers or dry collodion plates.

## Wax-Paper Process.

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THE following formula for the wax-paper process is one which I have employed for some time with more than average success, and which is almost reduced to its simplest expression. It is very little more than the process given in *Notes and Queries* for November, 1852, p. 443, by my friend the present Editor of the *Photographic Journal*.

I suppose Marion's paper *extrà prompt* to be employed, waxed in the usual manner.

Boil for ten minutes in one quart of distilled or clean rain-water, three ounces of well-washed rice. This rice-water contains a large portion of starch; *that* is not the part of the rice which we require. There is starch enough already in the



papers of French manufacture; and any addition to it gives the negative, and consequently the positives, a roughness of surface, and sometimes spottings, which destroy the beauty of the picture. But there is in the rice a glutinous portion which answers admirably for filling up the pores of the paper, and giving it a smoother surface. The particles of starch are soon got rid of by means of free iodine, as recommended by Mr. Ramsden, in the *Photographic Journal* for October, 1853.

Take twenty ounces, fluid measure, of the above rice-water, and dissolve in it four drachms of iodide of potassium, (and, if you like, one scruple of bromide of potassium, though I doubt its usefulness). Now add pure iodine in grain, until the whole of the starch is precipitated, and the liquid is coloured like dark sherry. I have often found, that after all the starch was apparently precipitated, and I had filtered the solution, I was obliged to filter the bath again, because more starch had been deposited. In a word, then, *all*

the starch *must* be precipitated, and *after that*, the liquid should be filtered.

The solution being poured into a flat dish, scrupulously clean, the paper must be soaked therein for two or three hours at least. The glass triangles, as mentioned before, are the best instruments for plunging the papers in, and removing all air-bubbles from their surface. Do not place too many papers in the solution at one time. Keep moving them about, occasionally changing their position in the bath. Take them out at the end of the time mentioned, and pin them up to dry. One word, however, about drying them. It is often said that they may be iodized and hung up to dry in daylight; let me recommend that these processes be done in the dark operating-room, or at night. The smallest quantity of white light injures them more or less. The iodide of potassium is very easily decomposed, and then the iodine set free seizes upon the starch and wax in the paper, and gives a speckled appearance.

It is easy to say that the sensitizing solution, in its turn, converts the whole of the iodine into iodide of silver: there is no doubt it does; but it is not easy to conceive that the particles of starch in the sizing of the paper, or in the wax, are equally distributed over and through the paper. When the iodide of potassium is decomposed, the particles of starch act as centres of attraction for the free iodine. The nitrate of silver finds a greater amount of iodine where these atoms of iodide of starch exist; and the consequence is, that the paper has an unequal surface of sensitiveness given to it, and hence granulated pictures. With the iodizing bath as above, and taking the precaution of always iodizing in a dark room, I have never any granulated negatives. In the November (1857) number of the French Photographic Society, there is a very good paper by M. Davanne, upon the means of preventing the granulated appearance of wax-paper negatives. He says, that the granulation can be explained by

the unequal distribution of the wax, and of the chemical agents, which are collected together in small centres (*qui se mamelonent*), after the iodide of potassium bath, and which leave an unequal facility to the penetration of the nitrate of silver, and, by consequence, to its reduction; and the remedy he proposes is, to remelt the wax in the paper after the iodizing, by passing a warm iron over each sheet, placed between leaves of blotting-paper. And to enable the paper to be kept without deterioration, after sensitizing, he recommends that it should be left a very short time (a minute) upon the aceto-nitrate bath, be washed well, and kept as much as possible from the influence of the atmosphere.

THE SENSITIZING BATH IS THE ORDINARY ONE.

Distilled Water . . . . .	1 ounce.
Nitrate of Silver . . . . .	30 grains.
Acetic Acid . . . . .	1 drachm.
Iodide of Potassium . . . . .	$\frac{1}{2}$ grain.



Paper sensitized on glass plate, and washed well afterwards in rain-water.

Exposure in camera from five to twelve minutes, according to circumstances of light, &c.

Developing bath of half-saturated solution of gallic acid, with half a drachm of aceto-nitrate to each eight ounces of gallic-acid solution.

Never employ the water used for washing the negatives in the operation of developing.

Wash well, and fix as usual with hyposulphite of soda. Then wash well in many waters; hang up to dry, and hold the negative before a fire to restore its transparency.

#### FORMULA BY M. GEOFFRAY.

A Swiss friend has just given me a formula by M. Geoffray, which some of my readers may be glad to try; I give the literal translation of it:—

“Take some wax-paper which has been iodized a long time, and of the goodness of which you are no longer sure. Sensitize with aceto-nitrate of

silver of the strength of six per cent. of silver. Wash well in distilled water, and plunge the paper, still wet, into the following albumin bath:—

“Albumin and distilled water, equal parts, in which you have dissolved two per cent. (of the weight of the liquid) of iodide of potassium.

“After a quarter of an hour or more, remove from bath, and hang up to dry. Papers so prepared, keep many months. Sensitize them (when you wish to use them) in the usual way, but with fifteen per cent. of acetic acid.

“If you employ the paper dry, you must wash it, and then dry it between blotting-paper.

“The exposure, with single lens, is from a quarter of an hour to twenty minutes.”

In addition to the above formula, I may say that old iodized papers, reiodized simply as at first, are perfectly restored to their original efficacy.

It is generally supposed that papers prepared by the Talbotype process, and sensitized with gallic acid, and not used when intended, are only fit to

be thrown away. The Vicomte Vigier, in some notes read before the French Photographic Society, details his method of economizing such papers; and, as I have never seen it mentioned in any work on Photography, I think it may be of use to note it here: —

“If I do not employ all the paper I have sensitized, I plunge it in a bath containing a few grammes (one gramme=fifteen grains and a half) of iodide of potassium. I thus convert the slight excess of silver, which rendered my paper sensitive, into a fresh coating of *insensitive* iodide of silver; I then well wash the paper as at its first ioduration; and when I have dried it, I place it in a portfolio to use when required. My paper, sensitized before not only with an excess of silver but of gallic acid, comports itself, after the second bath of iodide of potassium, exactly like any of my papers prepared as usual; and I obtain, when I sensitize it afresh, negatives without spots, and identically the same in all respects as my others.”

## M. MARION'S NEGATIVE PROCESS WITH HIS PAPER

## "EXTRA-PROMPT."

The description of this process is taken from notes supplied me by M. Marion himself, and from M. Monkhoven's book, entitled *Méthodes simplifiées de Photographie sur Papier.*"

The greatest possible care is taken in the manufacture of the paper *extrà-prompt*. The materials of which it is composed are most carefully selected; the paper is washed in acids to get rid of all impurities, and afterwards sized with gelatine, and well cylindered.

The waxing is conducted in the usual manner, especial caution being required not to use the irons too hot.

The paper is then iodized, for the first time, in the following bath:—

Rice-water . . . . .	18 fluid ounces.
Iodide of Potassium . . . .	4 drachms.
Bromide of Potassium . . . .	30 grains.



The rice-water is prepared by boiling three ounces of rice in two quarts of distilled water ; ten minutes' boiling is sufficient. This is filtered : first, through fine linen, and then through filtering paper. If the liquid is not quite clear, it must be filtered again ; lastly, add the iodide and bromide of potassium. The solution will keep a short time, but it is better to use it as soon as possible. The paper is to be immersed in this bath as directed in the other processes above, and left there for two or three hours. Then hang up to dry. When perfectly dry, it must be well cylindered in one of the presses used for cylindering the positives after they are mounted. This is a very important part of the process, and one which cannot be dispensed with. The paper is placed, a sheet at a time, between two Bristol-boards which have been previously cylindered to render them smooth, and all three are then passed several times through the press. And I may here recommend those photographers who possess one of these instruments

to cylinder all their negative papers after iodizing them. By this means the paper is rendered much smoother on the surface, and the wax, which was *mameloned* (to anglicise an expressive French word) after the iodizing bath, is spread evenly over the paper.

A second time the paper must be iodized. But now it is only floated on the surface of the bath, which is thus composed:—

Albumin . . . . .	20 ounces.
Serum of Milk . . . . .	6 ounces.
Iodide of Potassium . . . .	5 drachms.
Bromide of Potassium . . . .	1 drachm.

Dissolve the iodide and bromide in a small quantity of distilled water. Then add it to the albumin and serum, previously mixed in a porcelain bowl, and heat the whole to froth. Set it on one side for twelve hours, then filter it through fine muslin doubled. It may be used several times, if kept in a cool place, though it is better when fresh. It requires filtering always before use.

The paper may remain on the above solution for four or five minutes. After that it must be carefully removed, and hung up to dry. It is now extremely transparent. It must be preserved between leaves of blotting-paper.

The sensitizing solution is the same as is employed in the wax-paper process. As with the other processes already mentioned, I always employ a glass plate whereon to sensitize the paper. Let it float on its albuminized side for three or four minutes. Then float the same side for one minute in a bath of rain-water. After that place it between two sheets of blotting-paper, quite clean, and which have never been used before: then, by gently dabbing the outside leaf, remove all excess of moisture, and put it, while still damp, between the two glasses of the dark slide. The ordinary dark slide with two glasses is necessary in this process to enable the paper to retain its humidity and rapidity: It can be used dry, but it loses its great sensitiveness, because in this last case it is neces-

sary to wash the paper well after sensitizing it. When employed wet, it is very rapid. Exposure about one minute with landscape lens for half-plate.

The development with gallic acid, &c., is conducted in every respect as with the other wax-paper processes.

A VERY RAPID PROCESS, ENABLING THE PHOTO-  
 GRAPHER TO TAKE GROUPS OF PERSONS,  
 ANIMALS, ETC.

Another process, by M. Marion also, is well worthy of being described; and to the tourist who is unable to work with wet collodion, it is really valuable. With a compound lens, for half-plate, a very few seconds of exposure is sufficient.

The paper to be used for this process is that known by the name of *compact*; it has a close texture, is thick, and very solid. It must be cut into sizes a little larger than required. When



waxed, it is floated for ten minutes on the following solution:—

Alcohol . . . . 10 ounces, *by weight*.

Iodide of Ammonia  $2\frac{1}{2}$  drachms.

Bromide of Ammonia 1 drachm.

It is essential that this solution should be prevented from touching the back of the paper. The simplest way of ensuring this is to turn up the edges of the paper, and let the dish, thus formed, be floated on the bath. After ten minutes it should be removed with care and pinned up to dry. When dry, it is cylindered as in the last process; then, after cutting away the turned-up edges, it is iodized a second time, the bath being nearly the same as for the paper *extra-prompt*.

Albumin . . . . . 20 ounces.

Serum . . . . . 6 ounces

Iodide of Potassium . 5 drachms.

Bromide of Potassium . 2 drachms.

Float your paper upon this only one minute, taking care that the surface in contact with it is

the same as for the alcohol bath. Remove the paper and dry it. The paper will keep a few weeks, if preserved from damp.

FOR THE SENSITIZING BATH.

Distilled Water . . . 2 ounces fluid.

Nitrate of Silver . . . 8 grains.

Acetic Acid . . . . 15 grains.

The iodized side of the paper must remain three minutes in contact with this; then blot off and use at once. Developing and fixing as in the other processes.

## The Printing Process.

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THERE can be no doubt that the positives obtained by development, as in Blanquart Evrard's or Sutton's process, are more likely to be permanent than those obtained by sun-printing. At the same time it must be allowed, that the proofs produced by the ordinary method are far more agreeable in colour, and much richer in detail. In addition to this, the difficulty in the development printing, of judging, with any degree of certainty, of the proper exposure to the light, is so great, that but few amateurs are likely to grapple with it at present. Until some easier process, therefore, is discovered, photographers must practise the old method with all its drawbacks, taking all known precautions to render their prints as permanent as possible.

The positive paper I generally employ is Marion's *super héliovélin*. The *papier de Saxe* is most excellent also, when you can procure it genuine. With Marion's paper you can always be sure of the same quality. His super extra-albuminized, No. 516 of his Catalogue, is very good. I never trouble myself now with preparing the paper. For those who prefer to do so, the following directions, which are those given by Legray, years ago, will be sufficient:—

Float the smoothest side of your positive paper upon a solution of sal-ammoniac in rain-water:—

Water . . . . . 25 ounces.

Sal-ammoniac . . . . . 1 ounce.

Let it remain there four or five minutes; remove it, and pin it up to dry. If you use four or five dishes half filled with this solution, it is easy to prepare a great many sheets in one day. When dry, place them in a portfolio, and keep them from damp.

If you prefer albuminized paper, take the whites



of twelve eggs, and add to them an equal quantity, by measure, of rain-water, in which has been dissolved one ounce of pure chloride of sodium. Beat the whole to froth, in a large bason, with a clean wooden salad fork; let it rest for twelve hours at least; pour the clear liquid into a flat dish, and carefully float the smooth side of your paper upon it for five minutes; remove the sheet by one corner from the solution, raising it gently, and with an even continuous movement; pin it up to dry in a room free from dust. It is not necessary to iron the paper with a hot iron, as most books recommend, to coagulate the albumin, if a sufficiently strong solution of nitrate of silver is used for the sensitizing bath: keep the papers dry.

The sensitizing solution, of the proportion of sixty grains of nitrate of silver to one ounce of distilled water, is filtered into a scrupulously clean gutta-percha dish, to the depth of a quarter of an inch or more. On this float the salted or albuminized paper for four or five minutes; a little

longer for the albumin paper is better: gently remove it by one corner; let it drip into the dish, and pin up to dry in a warm and dark room. It is better to prepare the papers the previous evening: they will not keep long without deterioration.

It is absolutely necessary that the bath of nitrate of silver should be kept up to the same strength. Mr. Wood's argentometer is a very useful instrument, showing the exact number of grains there is of the nitrate in any solution of that salt. If the silver bath be not strong enough, the positives will have a flat unpleasant appearance altogether wanting vigour; and when albumin is used, the albumin, instead of being coagulated, will be dissolved by the bath, thus entirely spoiling the picture. The bath, when used for sensitizing albuminized paper, soon becomes discoloured. A drachm of kaolin added to it will soon remove the colour, if the bottle in which the solution is kept be frequently shaken.

## EXPOSURE TO LIGHT IN THE PRINTING-PRESS.

For some time I have used positive presses of the following description :—The glass-plate rests upon a frame of zinc plate, which is screwed to the front of the wooden frame. The hinged back is made of two pieces of thick plate-glass, covered with fine cloth, ensuring perfect contact between the negative and the positive paper. Instead of wooden screws to press down the back, a spring, of steel, is fastened to each of the cross-bars, giving a very equal pressure. These presses are of M. Marion's invention, and can be procured at 152, Regent Street. The pressure-frame being open, and the hinged back removed, the negative is laid, face upwards, on the glass plate, and the sensitive side of the positive paper placed in contact with it. The back is then carefully placed upon the paper, and the cross-bars pressed down and fixed. The plate-glass in front is now exposed to the direct rays of the sun, until the parts of the positives

which, in the finished picture, ought to be black, are of a metallic bronze colour. This is seen by opening one side only of the pressure-frame, and turning up a small portion of the positive, keeping the paper all the time from sunlight. When it is sufficiently printed, it must be removed from the frame in the dark operating-room, and toned and fixed as follows. The method is that indicated by Legray, long ago, and copied from him into all the treatises on photography:—

Hyposulphite of Soda . . .	2½ ounces.
Chloride of Gold . . .	7½ grains.
Common Salt . . . . .	2 scruples.
Nitrate of Silver . . . . .	1 drachm.
Water (rain) . . . . .	20 oz. (fluid).

Dissolve the nitrate of silver in two ounces of common water. Add to it the salt. Chloride of silver is precipitated. Wash the precipitate in two or three changes of water. Pour into a glass vessel eighteen ounces of the rain-water, and dissolve the



hyposulphite of soda in it. Add next the chloride of silver, and stir until all is thoroughly dissolved. Now make a solution of the chloride of gold in the remaining two ounces of rain-water, stirring it all the while with a glass rod. And lastly, pour the gold solution, by little and little, into the first solution, stirring it at the same time. This is the toning bath; and into this, the print, as it comes from the pressure-frame, must be plunged at once, and without hesitation, or the print may be stained. One of the glass triangles may be used with success in this process. In a certain time, varying according to circumstances, the print will attain a beautiful rich brown colour, and must then be removed to the fixing-bath, where it must remain at least a quarter of an hour, so as to dissolve out every particle of chloride of silver.

#### FOR FIXING-BATH.

Hyposulphite of Soda . . . 2 ounces.

Water . . . . . 20 ounces.

The toning-bath will last a long time, and will tone many prints. A few grains of chloride of gold must be added now and then, to keep up its toning properties. The fixing-bath ought not to be used many times ; indeed, it is far safer to make a small fresh bath for every print that is really worth preserving.

Wash the print well, when the fixing is finished, in common water, often changed. It must remain in water at least twelve hours.

When thoroughly washed, take it out and dry it ; if on plain paper, by pressing it between blotting-paper. If, however, it is on albuminized paper, it ought to be dried by suspension, attaching a bit of blotting-paper to the lower corner ; for after such long soaking, the film of albumin is very easily and often removed by the blotting-paper, and then the print has a dead tarnished look.

The prints thus finished are cut neatly to the desired size, and mounted upon Bristol-board, two or three inches larger all round than the positives.

The print is laid upon the Bristol-board, and its position marked by dots, with a pencil, at the corners. The card is then moistened all over with a sponge and clean rain-water. The back of the positive is covered with a solution of starch in boiling water (it must not be thick). The picture is next carefully laid in its right position on the moist card-board, and all excess of starch and bubbles pressed out gently, by means of a fine cambric handkerchief. Suspend by one corner to dry; and, if possible, pass it through a press afterwards.

#### POSITIVES TAKEN BY THE NEGATIVE PROCESS.

Most beautiful transparent stereoscopic pictures are obtained upon the paper *extra-prompt*. All the preliminary operations are the same as described at page 19. When the paper comes from the sensitizing bath, it is well washed, in two changes of rain-water; then pressed gently between

two sheets of clean dry blotting-paper, and dried between leaves of fresh blotting-paper.

The exposure to light under negative in the printing-frame varies from two to twenty seconds. Too long an exposure must be avoided. Develop in a gallic-acid bath, adding a very small quantity of aceto-nitrate of silver solution. Fix as usual.

The following formula, from Blanquart Evrard's book, is very useful for taking a positive quickly, by which to judge of the effect of a negative:—

Filter a quart of serum of milk; then add to it sugar of milk, one ounce and a quarter; iodide of potassium, one ounce; the whites of two eggs beaten to froth; mix well, and filter again.

On this bath float the papers for five minutes. Hang up to dry; hold the paper near a hot fire; sensitize as usual. Exposure on a dark day from ten to forty seconds. Develop as usual, using a small proportion of aceto-nitrate solution in the gallic-acid bath.



## Concluding Notes and Remarks.

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MR. KINNEAR, in a very interesting paper, describing an architectural and photographic tour in the North of France, gives good advice, in recommending Photographic tourists to carry with them all the chemicals they can possibly require. I can bear testimony to the dearness and badness of chemical products in this part of the world. Amateurs here are compelled to send to Paris or London for every thing "photographic": it is quite impossible to obtain even a foot of glass fit for a collodion positive.

Mr. Kinnear mentions that, all through their journey, they found the water very hard, and charged with salts, and in one place their gallic-acid solution turned immediately green from the

iron contained in it. The water in this part of Switzerland has invariably the effect named; and I never use it for washing the sensitive papers, or making the gallic-acid solution. Living here, I always keep a store of large glass bottles, similar to our sulphuric-acid carboys, full of rain-water. For travellers however, stopping at Geneva, or Vevey or any of the places close to the Lake, I may add that the water of Lac Lemman is admirably adapted for Photography, being exceedingly pure, and is much to be preferred to the distilled water you buy at a high price. But in every little town on the Continent, it is easy during the summer months to purchase any quantity of ice from the confectioners, which answers every purpose required.

I do not, however, think that the transparent skies in Mr. Kinnear's negatives were altogether caused by the water employed. From some years' experience, I can assure my readers that it is very difficult to obtain perfectly dense skies with wax-

paper in this country; and this arises from the excessive glare of light. In fact, the skies in the negatives are nearly always overdone. It is next to impossible to obtain a landscape sufficiently exposed without over-exposure of the sky.





